Homework 16A

Data on two individuals’ preferences for a public good are reflected in the table below. *PA* and *PB* represent the prices individuals A and B, the only two people in the society, are willing to pay for the last unit of a public good, rather than do without.

|  |  |  |
| --- | --- | --- |
| **Quantity** | ***PA*** | ***PB*** |
| 2 | $12 | $11 |
| 3 | 10 | 9 |
| 4 | 8 | 7 |
| 5 | 6 | 5 |
| 6 | 4 | 3 |
| 7 | 2 | 1 |

(a) Complete the table below showing the collective willingness to pay for the public good in this society.

|  |  |  |
| --- | --- | --- |
| ***Qd*** | **Price** | ***Qs*** |
| 2 | $\_\_23\_ | 8 |
| 3 | \_\_\_\_\_ | 7 |
| 4 | \_\_\_\_\_ | 6 |
| 5 | \_\_\_\_\_ | 5 |
| 6 | \_\_\_\_\_ | 4 |
| 7 | \_\_\_\_\_ | 3 |

(b) Given the supply schedule for this public good as shown by the *Qs* column, what is the optimal quantity of this public good and what is the optimal price?

(c) What is the perceived marginal benefit and perceived marginal cost when 4 units of the public good are supplied? What does this indicate about the allocation of resources to this public good?

2. Imagine that a state government is considering the construction of a new state office building to consolidate state operations. Its estimate of the total costs and the total benefits of building a 4- 6-, 8-, or 10-story building is shown in the table below. (All figures are in millions of dollars.)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Project** | **Total cost** | **Marginal cost** | **Total benefit** | **Marginal benefit** |
| No building | $ 0 |  | $ 0 |  |
| 4-story building | 7 | $\_\_\_\_\_ | 8 | $\_\_\_\_\_ |
| 6-story building | 16 | \_\_\_\_\_ | 23 | \_\_\_\_\_ |
| 8-story building | 24 | \_\_\_\_\_ | 28 | \_\_\_\_\_ |
| 10-story building | 34 | \_\_\_\_\_ | 31 | \_\_\_\_\_ |

(a) Compute the marginal cost and the marginal benefit of the 4-, 6-, 8-, and 10-story buildings.

(b) Should the state build a new office building? If so, what size building and what will be the total benefit, total cost, and *net* benefit to society?

**Total Marginal Total Marginal**

**Project cost cost benefit   benefit**

No building $ 0 $ 0

4-story building 7 $ 7 8 $8

6-story building 16 9 23 15

8-story building 24 8 28 5

10-story building 34 10 31 3

(a) *See table above.*

(b) Yes, the government should build a 6-story building. The total cost of building a 6-story building is $16 million. The total benefit is $23 million. The net benefit is $7 million. [text: E pp. 560-562; MI pp. 316-318]

3. Under what circumstances might the Coase theorem *not* be applicable (create your own example, don’t take it from the textbook or a friend)? Apply these circumstances to an example to illustrate your point.

When property rights are not clearly defined, the number of people involved is large, and bargaining costs are high, the Coase theorem may not apply. Acid rain in both the United States and Canada can affect people in both nations. In this case, the property rights are not clearly defined regarding externalities from rainfall. The number of people involved in both nations is large. Also the costs of bargaining are high given the geographic range of the problem and the number of people involved. Thus, the problem will be resolved through government negotiations between the two nations. [text: E p. 563; MI p. 319]

4. Assume the atmosphere of an urban area is able to reabsorb 4000 tons of pollutants per year. The schedule below shows the price polluters would be willing to pay for the right to dispose of 1 ton of pollutants per year and the total quantity of pollutants they would wish to dispose of at each price.

|  |  |
| --- | --- |
| **Price**  **(per ton of pollutant rights)** | **Total quantity of pollutant rights demanded**  **(tons)** |
| $ 0 | 8000 |
| 1000 | 7000 |
| 2000 | 6000 |
| 3000 | 5000 |
| 4000 | 4000 |
| 5000 | 3000 |
| 6000 | 2000 |
| 7000 | 1000 |

(a) If there were no emission fee, how many tons of pollutants would there be and how much greater would this amount be than the capacity for reabsorption?

(b) What pollution fee should the urban authorities charge to solve the problem?

(c) What would happen in this market for pollution rights if quantity demanded increased by 1000 tons at each price?

(a) If there were no emission fee, polluters would put 8,000 tons of pollutants in the air each year. This quantity of pollutants would exceed the ability of nature to reabsorb them by 4,000 tons.

(b) To reduce pollution to the capacity of the atmosphere to recycle pollutants, an emission fee of $4,000 per ton should be set.

(c) Were the quantity of pollution rights demanded at each price to increase by 1,000 tons, the emission fee could be increased by $1,000 to $5,000 and total emission fees collected would be $20 million. [text: E pp. 566-567; MI pp. 322-323]